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| 10/508,448 | 09/20/2004 | Tadashi Matoba | 040302-0409 | 6714 |

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| EXAMINER | |
|---|---|
| MARTIN, ANGELA J | |

| ART UNIT | PAPER NUMBER |
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| 1745 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/508,448 | MATOBA ET AL. | |
| | Examiner | Art Unit | |
| | Angela J. Martin | 1745 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *20 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 September 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/3/05;9/20/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Okamoto et al., U.S. Pat. Application Pub. 2001/0014414 A1.

Rejection of claims 1-17 drawn to a fuel cell system; claim 18 drawn to a method of controlling a fuel cell system.

Okamoto et al., teach a fuel cell system comprising: a fuel gas supply unit supplying fuel gas; an oxidant gas supply unit supplying oxidant gas; a fuel cell stack generating electric power using the fuel gas and the oxidant gas; an anode off-gas recirculation unit recirculating anode off-gas, discharged from an anode of the fuel cell stack, to the anode; a purging unit temporarily discharging the anode off-gas from the anode off-gas recirculation unit to an outside thereof; a combustor combusting at least the anode off-gas, discharged from the purging unit, and the oxidant gas or cathode off-gas discharged from a cathode of the fuel cell stack; and a system controller operative to perform system control such that when permitting the purging unit to discharge the anode off-gas to the combustor, a combustion temperature of the combustor does not exceed a given temperature (0024). The fuel cell system according to claim 1, wherein

the system controller is operative to predict at least one of a flow rate and a composition of mixed gas, flowing into the combustor, based on an operating load of the fuel cell stack for providing a predicted result and to predict the combustion temperature of the combustor based on the predicted result such that when a predicted combustion temperature is judged to exceed the given temperature, the system control is executed so as to preclude the combustion temperature from exceeding the given temperature (0025). The fuel cell system according to claim 2, wherein the system controller is operative to perform control such that if the predicted combustion temperature is judged to exceed the given temperature when temporarily discharging the anode off-gas from the anode off-gas recirculation unit, a flow rate of the oxidant gas to be supplied from the oxidant gas supply unit is increased for thereby increasing flow rates of the oxidant gas or the cathode off-gas to be supplied to the combustor (0025). The fuel cell system according to claim 2, further comprising an auxiliary oxidant gas supply unit supplying auxiliary oxidant gas to the combustor; wherein the system controller is operative to perform control such that if the predicted combustion temperature is judged to exceed the given temperature when temporarily discharging the anode off-gas from the anode off-gas recirculation unit, the auxiliary oxidant gas is additionally supplied to the combustor from the auxiliary oxidant gas supply unit (0025). The fuel cell system according to claim 2, wherein the system controller is operative to perform control such that if the predicted combustion temperature is judged to exceed the given temperature when temporarily discharging the anode off-gas from the anode off-gas recirculation unit, an anode off-gas flow rate is set to be less than a predetermined discharge flow

rate and an anode off-gas discharge time interval is increased (0025). The fuel cell system according to claim 2, wherein the system controller is operative to perform control such that if the predicted combustion temperature is judged to exceed the given temperature when temporarily discharging the anode off-gas from the anode off-gas recirculation unit, a cathode off-gas flow rate and an anode off-gas discharge flow rate are not altered whereas an anode off-gas discharge time interval for one cycle is set to be shorter than a predetermined discharge time interval and the anode off-gas is discontinuously discharged in the number of plural times (0025). The fuel cell system according to claim 2, wherein the system controller is operative to perform control such that if the predicted combustion temperature is judged to exceed the given temperature when temporarily discharging the anode off-gas from the anode off-gas recirculation unit, water is supplied to the combustor at a given flow rate (0027-0029). The fuel cell system according to claim 3, wherein the system controller is operative to predict the combustion temperature through an enthalpy calculation of gases flowing into or flowing out from the combustor (0026). The fuel cell system according to claim 3, wherein the system controller is operative to preliminarily store a map of combustion temperatures in terms of a cathode off-gas discharge rate condition that is experimentally obtained in advance and to predict the combustion temperature referring to the map of the combustion temperatures (0026). The fuel cell system according to claim 1, wherein the system controller is operative to commence increasing flow rates of the oxidant gas or the cathode off-gas to be supplied to the combustor from the oxidant supply unit, prior to permitting the purging unit to commence discharging of the anode off-gas, for limiting a

variation rate of the flow rates (0032; 0035). The fuel cell system according to claim 1, wherein the system controller is operative to commence decreasing flow rates of the oxidant gas or the cathode off-gas to be supplied to the combustor from the oxidant supply unit, subsequent to discharging of the anode off-gas being terminated, for limiting a variation rate of the flow rates (0051-0052). The fuel cell system according to claim 1, wherein the system controller is operative to limit a variation rate of flow rates of the oxidant gas or the cathode off-gas to be supplied to the combustor from the oxidant supply unit such that absolute values in variation rates of the oxidant gas, to be supplied from the oxidant gas supply unit to the combustor, or the cathode off-gas decrease as temperatures of the oxidant gas or the cathode off-gas increase (0059). The fuel cell system according to claim 1, wherein the system controller is operative to advance a timing at which flow rates of the oxidant gas, to be supplied to the combustor from the oxidant supply unit, or the cathode off-gas are commenced to be increased as temperatures of the oxidant gas or the cathode off-gas increase (0039; 0059). The fuel cell system according to claim 1, wherein the system controller is operative to limit variation rates in flow rates of the oxidant gas, to be supplied to the combustor from the oxidant supply unit, or the cathode off-gas such that an absolute value of the variation rate decreases as flow rates of the oxidant gas or the cathode off-gas increase (0039; 0070). The fuel cell system according to claim 1, wherein the system controller is operative to advance a timing at which flow rates of the oxidant gas, to be supplied to the combustor from the oxidant supply unit, or the cathode off-gas are commenced to be increased as flow rates of the oxidant gas or the cathode off-gas increase (0039).

The fuel cell system according to claim 1, further comprising an oxidant gas pressure control unit controlling pressures of the oxidant gas or the cathode off-gas; wherein the system controller is operative to control oxidant gas pressure control unit such that absolute values in variation rates of flow rates of the oxidant gas or the cathode off-gas, to be supplied to the combustor, during a decremental phase of the flow rates subsequent to an incremental phase of the flow rates of the oxidant gas or the cathode off-gas to be supplied to the combustor are made less than absolute values in the variation rates of the flow rates of the oxidant gas or the cathode off-gas to be supplied during the incremental phase (0035). A fuel cell system comprising: fuel gas supply means supplying fuel gas; oxidant gas supply means supplying oxidant gas; a fuel cell stack generating electric power using the fuel gas and the oxidant gas; anode off-gas recirculation means recirculating anode off-gas, discharged from an anode of the fuel cell stack, to the anode; purging means temporarily discharging the anode off-gas from the anode off-gas recirculation means to an outside thereof; a combustor combusting at least the anode off-gas, discharged from the purging means, and the oxidant gas or cathode off-gas discharged from a cathode of the fuel cell stack; and system control means operative to perform system control such that when permitting the purging means to discharge the anode off-gas to the combustor, a combustion temperature of the combustor does not exceed a given temperature (0024;0039-0040). A method of controlling a fuel cell system, comprising: preparing a fuel gas supply unit supplying fuel gas, an oxidant gas supply unit supplying oxidant gas, a fuel cell stack generating electric power using the fuel gas and the oxidant gas, a combustor combusting at least

anode off-gas, discharged from an anode off-gas, and the oxidant gas or cathode off-gas, discharged from a cathode of the fuel cell stack; discharging anode off-gas from the anode of the fuel cell stack; recirculating the anode off-gas, discharged from the anode of the fuel cell stack, to the anode; combusting at least the anode off-gas, discharged from the anode of the fuel cell stack, and the oxidant gas or cathode off-gas discharged from the cathode of the fuel cell stack; and executing system control such that when permitting the anode off-gas to be discharged to the combustor, a combustion temperature of the combustor does not exceed a given temperature (0039; 0069).

Thus, the claims are anticipated.

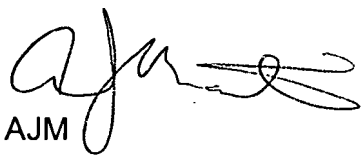
***Conclusion***

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Takamura, U.S. Pat. Application Pub. 2001/0016275 A1, teaches a fuel cell system comprising a combustor. Chalfant et al., EP 1122805 A2, teach a method of operating a combustor in a fuel cell system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angela J. Martin whose telephone number is 571-272-1288. The examiner can normally be reached on Monday-Friday from 9:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



AJM